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ABSTRACT

On the college level controllable consequences that are likely to improve achievement are scarce and often unimaginatively used. Student assessment and grades have typically been emphasized. The purpose of this study was to determine if achievement could be improved by providing an increase and choice of contingencies following academic performance. The options included events that many instructors often dispense noncontingently such as postponing quizzes and allowing extra credit. Student performance on practice quizzes was compared under a contingency and a noncontingency condition. If students performed better when these events were made contingent on measures of achievement, then it would be concluded that the events were reinforcing. Results were mixed. The contingency condition was effective in producing higher scores for one class but not for the other. (Author)

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THE EFFECT OF REINFORCEMENT CONTINGENCIES INDIGENOUS TO COLLEGE CLASSROOMS

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College courses based on experimental analysis principles have been found to be very effective in attaining specific course goals (Ferster & Perrott, 1968; Keller, 1968; Lloyd & Knutzen, 1969; Myers, 1970; Whitehurst, 1972). When these courses have been compared with more conventionally taught courses, students in contingency managed classes performed significantly better on measures of academic achievement (Alba & Pennypacker, 1972; McMichael & Corey, 1969; Sheppard & MacDermot, 1970). In addition, students not only admitted to working harder and learning more than in conventionally taught courses but many also reported that they would be interested in taking courses organized in a similar fashion (Keller, 1968; Lloyd & Knutzen, 1969; McMichael & Corey, 1969; Myers, 1970).

Courses taught in this manner have included a variety of arrangements, ranging from a Doom's Day Contingency (Malott & Svinicki, 1969) to personalized bedside instruction (Johnston & Pennypacker, 1971). While each of the courses differed in such areas as mastery, self-pacing, lecture presentations and the specification of course goals, all of the courses assessed student performance frequently. Student evaluation in the form of various written and oral quizzes and reports was the main consequence of academic achievement that was managed. While it is not denied that frequent assessment has an effect on achievement and studying behavior (Mawhinney, Bostow, Laws, Blumenfeld & Hopkins, 1971), it is not unlikely that there are other consequences which can also be effectively managed by college instructors to improve performance.

Little effort has been expended to insure that a variety of consequences are reinforcing to college students. Most of the effort has been directed at increasing and optimizing the time of student evaluations. In contrast, investigators have painstakingly identified a variety of consequences which may be reinforcing to school aged children (Addison & Homme, 1966) and mental patients (Ayllon & Azrin, 1968). An analysis of the typical classroom reveals that instructors do dispense events --- often noncontingently --- which may be

reinforcing for some students. These include such options as postponing examinations, making provisions for extra credit, cancelling class and dropping low scores. It is possible that instructors do not make the fullest use of the reinforcers which are available to them. The purpose of this study was to determine if events indigenous to college classrooms were reinforcing for students, i.e., if academic achievement could be improved by providing an increase and choice of contingencies following academic performance.

Method

Potentially reinforcing events were specified, and then contingency contracts were arranged in which these events were made contingent on a certain level of academic achievement. Students' performance was compared under two conditions, a contingency condition and a noncontingency condition. Under the contingency condition, the potentially reinforcing events were made contingent on evidence of academic achievement. Under the noncontingency condition, no particular consequences followed performances on the measures of academic achievement. If students performed significantly better under the contingency condition, then it could be concluded that the events acted as reinforcers for some students.

Subjects Students enrolled in two educational psychology courses at the University of Illinois served as subjects in this study. Fifty-seven of the subjects were undergraduates registered in two sections of Ed. Psych. 211, held at eleven and two o'clock. With the exception of different class times, the instructor, assigned readings, class lectures and activities were the same for both sections. The course grade was based on two midterms, a final examination, and a special project.

The other 19 subjects were practicing teachers and psychological personnel enrolled in Ed. Psych. 490, a graduate seminar on experimental analysis principles and their application to classroom settings, taught by the experimenter. The course grade was based on bi-monthly quizzes, exercises following each unit, and three projects.

Identification of potentially reinforcing events Two criteria determined the potentially reinforcing events which were initially drawn up. First, these events were thought to be desired by students attending college classes. Secondly, the events had to be under the control of the instructor, i.e., the events could only be obtained when the conditions of the contract were met.

Some of the events which met the above criteria included:

1. Scheduling a conference with the instructor.
2. Obtaining a list of readings in a preferred subject area.
3. Being able to do extra credit work.
4. Modifying or waiving course projects.
5. Disregarding quiz scores.
6. Waiving the final examination.
7. Changing the times of quizzes.

Suggestions for these events were based on an analysis of classroom events. In addition, during the semester students in each of the classes were encouraged to suggest options of their own. Students were told that if their suggestions were approved by the instructor, they would be included on the list later during the semester. Two students from the 490 class suggested two alternatives which were later included (modifying quiz questions and substituting the score of a practice quiz if it should be higher than the corresponding class examinations).

Response measure The main response measure was the number correct on practice quizzes given throughout the semester. Practice quizzes were different from the class examinations in that they did not count toward the course grade. They were introduced so as to minimize as much as possible the effect of grades, a likely reinforcer for most students. Other than the grading aspect, the practice quizzes were identical to the class examinations in content and format. Pairs of questions were devised and then randomly assigned, with one set arbitrarily designated as the practice quiz, the other as the class examination. Students were told that the practice quizzes should be helpful for studying purposes since the practice quizzes were similar in content and format to the class examinations.

In Ed. Psych. 211, four hourly practice quizzes and four corresponding class examinations containing from 45 to 57 multiple choice items were planned. However, due to the "student strike" following the deaths of four Kent State students, only two hourly practice quizzes and two corresponding class examinations were given. The instructor administered a final examination which covered the last two sections of material. In Ed. Psych. 490, six 30 minute practice quizzes composed of both multiple-choice (10) and short answer questions (from 3 to 6) were administered in addition to the six corresponding class examinations.

The experimenter scored all of the quizzes with predetermined scoring keys. While scoring the quizzes, the experimenter was not aware of either the subjects' identities or the group to which each subject had been assigned.

Other design considerations While the main interest centered on the differential effects of the contingencies on the measures of academic achievement, other variables could also influence the scores obtained, such as the composition of the various classes, the varied meeting times, and the quizzes which differed in content and date of administration.

To control for these potentially confounding variables, subjects in each of the respective sections and classes were divided into two groups. One group had the contingency condition open to them for the odd-numbered practice quizzes and the other group had the contingency condition open to them for the even-numbered practice quizzes.

Experimental design This procedure resulted in a three way factorial design for the 490 class with two levels of Condition, contingency and noncontingency, two levels of Group, the odd-numbered contingency quiz group and the even-numbered contingency quiz group, and three levels of Quiz set, the first, second, and third set of quizzes. Subjects were nested under the group factor.

For the 211 class, this arrangement resulted in a three way factorial design with two levels of Condition, two levels of Group, and two levels of Class, the eleven and the two o'clock classes. Subjects were nested under the group and the class factors.

Results and Discussion

Since the purpose of this study was to determine if academic achievement could be improved by providing an increase and choice of contingencies following academic performance, analyses of variance and directional t tests were carried out with the practice quiz scores from two college classes.

In the Ed. Psych. 211 class, the contingency condition was effective in producing higher practice quiz scores. After the F ratio had been converted to a t ratio, it was found that the t ratio (t 1,54 = 1.77) was significant at the .05 level for a one-tailed test. In the other class, the presence or absence of the contingencies was not effective in producing differences in the practice quiz scores. Students performed approximately the same on practice quizzes, regardless of whether they had a choice of consequences or not.

Although the results were mixed, the options were reinforcing for some

students in that they did improve academic performance on practice quizzes. It would be very interesting to determine the conditions under which these options can consistently improve academic performance. Or perhaps this arrangement is more suitable to some types of class organizations and students than others. In this study the options were found to be reinforcing only in the more traditionally taught class with infrequent student evaluations and rather vague course goals. The other class not only included more frequent evaluations but the goals were specified for each unit and students were required to complete exercises at the end of each unit. Another difference between the two classes was the student populations. Students in the more traditionally taught class were undergraduates, for the most part full-time, whereas the other class was an extension course open only to practicing teachers and psychological personnel. Many interesting hypotheses for future research are implied.

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Footnote

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